Harvester Accumulator and Basket Structure

Field of the Invention

[0001] The present invention relates generally to agricultural harvesters and, more specifically, to a harvester basket and accumulator system useful with implements such as cotton harvesters.

Background of the Invention

[0002] Harvesters such as cotton pickers and cotton strippers include upright cotton conveying ducts directing cotton from the harvesting structure upwardly and rearwardly into a telescoping basket or receptacle. One problem with such a fixed arrangement is lost productivity resulting from the need to stop the harvester to dump the cotton into a boll buggy, module builder or cotton trailer. Typically the basket must be raised for unloading, and the flow of cotton from the air system has to be stopped to avoid crop loss. Although accumulator systems such as shown in commonly assigned U.S. Patent No. 6,263,650 have been built for use with on-board processors such as module builders or bailers to avoid interruptions in harvesting during unloading, the problem of lost productivity during basket unloading in off-machine processing systems still persists. Since off-machine processing and the infrastructure associated with such processing continues to dominate the cotton industry, an improved system is necessary to reduce or eliminate harvester down time during basket unloading.

Summary of the Invention

[0003] It is therefore an object of the present invention to provide an improved on-board storage system for a harvester. It is a further object to provide such a system which facilitates continued harvester operation during storage unloading. It is yet another object to provide such a system which overcomes the aforementioned problems.

[0004] It is a further object to provide an improved storage system for a harvester having a basket movable to unloading condition for transferring crop such as cotton to an off-harvester receiver such as a trailer, boll buggy or module builder. It is another object to provide such a system which increases productivity of the harvester by facilitating unloading while the harvester continues to operate in the field. It is another object to provide such a system which is particularly useful with

currently available infrastructure employed to remove cotton from the harvester.

[0005] An accumulator is mounted between crop removing structure and the storage basket on a harvester such as a cotton picker or stripper. The accumulator permits crop material to continuously pass from a conveying duct through to the basket until the basket is ready for unloading. Upon activation of a switch or sensor, for example, during unloading of the basket, crop flow to the basket is interrupted. During interruption of flow to the basket, cotton is stored in the accumulator. When the basket is ready to receive harvested crop again, the cotton stored in the accumulator during unloading of the basket is metered into a second duct that conveys the cotton to the basket. A system of rollers selectively meters cotton from the accumulator to the second duct. When turning, the rollers allow cotton to pass, and when stopped, the rollers prevent egress of cotton. A diverter may be utilized at the top of the accumulator to selectively allow cotton to move directly into the basket or to deflect the downwardly into the accumulator.

[0006] The accumulator facilitates continued harvesting while the basket is unloaded. When the operator initiates the dump cycle, the metering rolls stop turning. If the diverter is employed, material flow to the basket is automatically stopped, and the crop is directed downwardly into the accumulator. As the basket is dumped, removed crop is collected in the accumulator.

[0007] The accumulator for a cotton harvester holds enough cotton to allow the basket to unload while the harvester continues to operate in the field. The metering rolls and second duct are sized to generally match the capacity of the other harvester systems and move cotton quickly enough to empty the accumulator before the next dump cycle. The system provides greatly improved cotton harvester productivity and does not require changes in the current infrastructure employed to remove cotton from the harvester.

[0008] These and other objects, features and advantages of the present invention will become apparent to one skilled in the art upon reading the following detailed description in view of the drawings.

Brief Description of the Drawings

[0009] The single drawing figure is a side view of a cotton harvester including accumulator and basket structure facilitating basket unloading while the harvester continues to operate in the field.

Description of the Preferred Embodiment

[0010] Referring now to FIG. 1 therein is shown a cotton harvester 10 having a main frame 12 supported for movement by forward drive wheels 14 and rear steerable wheels 16. An operator station or cab 18 is supported at the front end of the main frame 12 above forwardly mounted harvesting structure indicated generally at 20 which removes cotton from plants and directs the removed cotton into a harvester air duct system 22 including air jet nozzle structure 23 and upright telescoping duct structure 24 extending from the harvesting structure 20 to a duct outlet 26 opening rearwardly toward a forwardly opening upper inlet area 28 of a basket or receptacle 30.

[0011] An upright accumulator system 34 with an upper inlet 36 and a metering floor or gate 38 is supported on the frame 12 behind the cab 18 for receiving the cotton from the first air duct 22. The accumulator system 34 is supported forwardly adjacent the harvester basket 30 with the inlet 36 opening upwardly into a transition area between and below the basket inlet area 28 and the duct outlet 26. The accumulator structure may be generally of the type of construction shown and described in commonly assigned U.S. Patent No. 6,236,650 with the exception of the conveying structure area adjacent the metering floor 38.

[0012] A hood and diverter grate system 40 is supported in the transition area and includes finger grates 42 which allow some of the trash and debris blown from the duct outlet 26 to exit the stream of cotton flowing from the duct structure while maintaining a flow path of the cotton below the grates. The finger grates 42 are movable between a horizontal position for allowing cotton to flow directly into the inlet area 28 of the basket 30, as shown at 42, and a downwardly directed diverting position 42' for intercepting the flow of material from the duct outlet 26 and directing

substantially all the material downwardly through the inlet area 36 into an accumulator chamber indicated generally at 44. The diverter grate system 40 may be generally of the type of construction shown and described in commonly assigned U.S. Patent No. 4,606,177.

[0013] A second air duct system 52 includes an upright duct 54 having a lower end opening into the metering floor 38 and an upper end 56 opening upwardly and rearwardly into the transition area towards the upper inlet area 28 of the basket 30. Air jet nozzle structure 60 directs air from cotton harvester air system 62, which also supplies air to the jet nozzle structure 23, upwardly into the duct 54 to draw cotton delivered from the metering floor 38 into the duct and to propel the cotton through the duct 54 and out the end 56 towards the basket inlet area 28.

[0014] The metering floor 38 may be any suitable structure for selectively opening and closing the lower end of the chamber 44 to the duct 54 and, as shown, includes a plurality of rollers 68 which, when rotated, meter the harvested material from the chamber 44 into the lower end of the duct 54. When the rollers 68 are stationary, they act to block egress of the material from the chamber.

[0015] In operation, cotton is removed from cotton plants by the units 20 and directed upwardly by the air duct system 22 to the outlet 26. The harvested material is propelled rearwardly over the accumulator inlet 36. With the finger grates 42 in the generally horizontal position, the harvested material is free to flow rearwardly through the hood and diverter grate system 40 directly into the basket 30. When the operator desires to unload the basket 30, the hydraulic system on the harvester is operated to initiate transition of the basket into an unloading mode. The unloading mode may include a raising or tilting of the basket 30 (arrow in the drawing figure), a lowering of a wall or conveyor, a lowering of a portion of a wall, or any other suitable means for efficiently moving harvested material from the basket 30. In the unloading mode, the basket inlet 28 may no longer align with the duct outlet 26, or the operator may desire for other reasons to interrupt flow to the basket while continuing to harvest.

[0016] To temporarily halt cotton flow from the row units into the basket 30, the finger grates 42 are positioned (42') to direct substantially all the harvested material

away from the basket inlet and downwardly into the accumulator chamber 44. Activation of the grates 42 may be accomplished in a conventional manner utilizing hydraulic or electric actuators and either an operator switch in the cab 18 or automatic switch or sensor structure responsive to the basket entering the unloading mode. The metering floor rollers 68 are stopped to close the bottom of the chamber 44 to egress of material while the basket 30 is in the unloading mode. The capacity of the chamber 44 is sufficient to hold all the material harvested while flow to the basket 30 is interrupted.

[0017] Once the basket 30 is again ready to receive harvested material, the metering floor rollers 68 are rotated by conventional variable speed drive structure on the harvester 10 and the air nozzle structure 60 is activated to meter material into the duct 54 for delivery to the basket 30. The chamber 44 may be gradually unloaded during normal harvesting operations at a rate such that the full capacity of the accumulator system 34 is available the next time flow to the basket has to be interrupted so continuous harvesting is assured. Alternatively, most or all of the flow of material to the basket 30 may be provided through the accumulator system 34 via metering floor and duct 54 by directing material from the duct outlet 26 into the inlet 34. The unloading rate can be varied by changing the speed of rotation of the rollers 68 to match harvest conditions and cotton handling capacities of the harvest system.

[0018] Having described the preferred embodiment, it will become apparent that various modifications can be made without departing from the scope of the invention as defined in the accompanying claims.